REMARKS

In response to the above-identified Office Action, no claims are amended, no claims are cancelled and no claims are added. Accordingly, Claims 1-24 are pending. Claims 1–24 are rejected. Reconsideration and withdrawal of the rejections of record are requested in view of such amendments and the following discussion.

I.   Drawings

The Examiner has rejected the drawings for failing to comply with 37 CFR §1.84(p)(5) because reference numerals included in the specification were omitted from the figures. Regarding reference elements 128 and 130, Applicants submitted a Preliminary Amendment to the Patent Office on December 7, 2000 (received by OIPE on December 11, 2000) wherein a replacement FIG. 3 was attached. Replacement FIG. 3 contained elements 128 and 130.

Regarding elements 1011 and 1001, Applicants amend the specification, specifically, page 7, lines 25 and 26, to remove reference to elements 1011 and 1001. Accordingly, in view of the Preliminary Amendment submitted on December 7, 2000, and Applicants' amendment of the specification, Applicants respectfully request that the Examiner reconsider and withdraw the objection to the drawings.

II.   Claim Rejections Under 35 U.S.C. §103

The Examiner rejects Claim 1-24 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,966,544 issued to Sager ("Sager") in view of PCT Patent Application No. WO 99/31589 issued to Akkary ("Akkary"). Applicants respectfully traverse this rejection.

To establish a *prima facie* case of obviousness, the following criteria must be met: (1) there must be some suggestion or motivation to modify the reference or combine the reference teachings, (2) there must be a reasonable expectation of success, and (3) the prior art references must teach or suggest all the claim limitations. (MPEP §2142) For the reasons provided below, the Examiner has failed to establish a *prima facie* case of obviousness in view of the references of record.

Regarding Claim 1, Claim 1 includes the following claim feature, which is neither taught nor suggested by either Sager, Akkary or the references of record:

> a scheduler coupled between the replay queue and the execution unit to speculatively schedule instructions for execution, to increment a counter for each of the plurality of instructions to reflect the number of times each of the plurality of instructions has been executed, and to dispatch each instruction of the plurality of instructions to the execution unit either when the counter does not exceed a maximum number of replays or, if the counter for the instruction exceeds the maximum number of replays, when the instruction is safe to execute. (Emphasis added.)

As correctly recognized by the Examiner, the aforementioned features of Claim 1 are not taught by Sager. According to the Examiner, Sager has taught that instructions that must repeat in the replay queue are older instructions and usually have higher priority. Applicants respectfully disagree with the Examiner's contention. According to the Examiner, the aforementioned teaching of Sager is taught at col. 10, lines 34-46. As is described in the passage cited by the Examiner:

> [I]n one embodiment, the processing priority between threads is used to indicate which one of the two threads is to have priority if both threads compete for a particular resource in order to make progress. For example, if a resource A is required to execute an instruction in thread 0 and another instruction in thread 1 at the same time, then the processing priority is used as a tie-breaker in this situation in order to prevent a deadlock situation. (*See* col. 10, lines 39-46.) (Emphasis added.)

After careful review of this cited passage, as well as the text found between lines 34 and 38 of col. 10 of Sager, Applicants fail to find any teachings indicating that instructions that must repeat in the replay queue are older instructions and usually have higher priority. Applicants respectfully submit that no such teaching is found within Sager. Specifically, Sager describes a technique to prevent thread deadlock by assigning threads alternating priority using an alternating priority scheme. Namely:

> Therefore, it is necessary to have a flexible and dynamic alternating priority scheme in which each thread is alternately given priority for some sufficient period of time in order for it to make progress, which in turn can help the other thread make progress. More specifically, each thread is to be alternately given the priority for some period of time initially. . . . As each thread is being executed, its progress is monitored to determine whether it is being stuck. If a particular thread, for example thread 0, has not made any progress in the period of time during which it has priority, then it will be given priority for a longer duration of time the next time it has priority. (*See* col. 9, lines 3-18.) (Emphasis added.)

Accordingly, Applicants find no teachings or references within Sager for a scheduler to replay instructions based on a replay count of the instructions, as required by Claim 1. Moreover, Applicants respectfully submit that the Examiner's citing of Akkary fails to rectify the deficiencies attributed to Sager in failing to teach or suggest the scheduler to replay instructions based on a replay count of the instructions, as required by Claim 1. According to the Examiner, these features are taught by Akkary at page 17, lines 7-18 and FIG. 13. Applicants respectfully disagree with the Examiner's contention.

After careful review of the passage cited by the Examiner, as well as the entire text of Akkary, it is clear that Akkary describes a technique wherein a processor includes a trace buffer outside the execution pipeline to hold speculatively executed instructions and wherein the instructions that are associated with speculation errors are replayed in the execution pipeline from the trace buffer. (*See* page 2, paragraph 1, under the Summary of the Invention at page 2.) As further described within Akkary:

A "Replay Count" field, which uniquely identifies an instruction dispatch, is incremented each time the instruction of the same instrID is replayed in pipeline 108. Under one embodiment, it is possible that instruction may be concurrently replayed more than one time within pipeline 108. In this case, under one embodiment, only the information associate with the highest "replay count" is written back to DAD array 206A. (*See* pg. 17, lines 13-18.)

In other words, when the cited passage is read in conjunction with the entire text of Akkary, it is clear that instructions associated with speculation errors are required to be replayed within the system taught by Akkary. As indicated, it is possible that an instruction may be concurrently replayed more than one time within pipeline 108. As a result, the retirement unit (final retirement logic 134) as taught by Akkary may use the replay count when instructions with the same instruction ID are detected. Once detected, the instruction having the highest replay count while discarding instructions with the lower replay count having a same instruction ID is retired.

Applicants respectfully submit that the use of a replay count within Akkary fails to teach or suggest the scheduler to replay instructions based on a replay count of the instructions, as required by Claim 1. Accordingly, Applicants respectfully submit that the Examiner fails to establish a *prima facie* case of obviousness of Claim 1 under 35 U.S.C. §103(a) over Sager in view of Akkary since Sager and Akkary fail to teach or suggest the aforementioned scheduler for replay of instructions, as required by Claim 1. Accordingly, Applicants respectfully submit that Claim 1 is patentable over Sager, Akkary and the references of record, whether viewed independently or in combination.

Furthermore, 35 U.S.C. §103(c) prohibits the Examiner from citing either Sager or Akkary to render Claim 1 obvious. Pursuant to 35 U.S.C. §103(c), (1) Sager and Akkary only qualify as §102(e) references and (2) the invention of the pending claims and the inventions of Sager and Akkary were, at the time the pending claims were made, owned by the same person or subject to an obligation of assignment to the same person. Here, the same person is Intel Corporation of Santa Clara, California. Thus, neither Sager nor Akkary can properly be cited as a §103(a) reference. Consequently, Applicants respectfully request that the Examiner reconsider and withdraw the §103(a) rejection of Claim 1.

Regarding Claims 2-12, Claims 2-12 depend from Claim 1, and therefore include the patentable claim features of Claim 1, as described above. Accordingly, Claims 2-12, based on their dependency from Claim 1, and for at least the reasons described above, are also patentable over the references of record. Consequently, Applicants respectfully request that the Examiner reconsider and withdraw the §103(a) rejection of Claims 2-12.

Regarding Claim 13, Claim 13 includes the following claim feature, which is neither taught nor suggested by the references of record:

at least two schedulers coupled between the replay queue and the execution units to schedule instructions for execution, to increment a counter for each of the

plurality of instructions to <u>reflect</u> the <u>number of times</u> each of the plurality of <u>instructions</u> has been <u>executed</u>, and to <u>communicate each instruction</u> of the plurality of instructions to the execution units <u>when the counter does not exceed a maximum number</u> or, if the <u>counter</u> for the instruction <u>exceeds</u> the <u>maximum number</u> of <u>replays</u>, <u>when</u> a <u>data required</u> by the <u>instruction is available</u>. (Emphasis added.)

Consequently, Applicants respectfully submit that for at least the reasons described above, the Examiner fails to establish a *prima facie* case of obviousness of Claim 13 over <u>Sager</u> in view of <u>Akkary</u>, since the proposed combination suggested by the Examiner fails to teach the aforementioned scheduler for replay of instructions as required by Claim 13.

Furthermore, 35 U.S.C. §103(c) prohibits the Examiner from citing <u>Akkary</u> or <u>Sager</u> as a §103(a) reference. Therefore, Applicants respectfully request that the Examiner reconsider and withdraw the §103(a) rejection of Claim 13.

Regarding Claims 14-18, Claims 14-18 depend from Claim 13, and therefore include the patentable claim features of Claim 13, as described above. Accordingly, Claims 14-18, based on their dependency from Claim 13, and for at least the reasons described above, are also patentable over the references of record. Consequently, Applicants respectfully request that the Examiner reconsider and withdraw the §103(a) rejection of Claims 14-18.

Regarding Claim 19, Claim 19 includes the following claim feature, which is neither taught nor suggested by either <u>Sager</u>, <u>Akkary</u> or the references of record:

<u>dispatching</u> one of the plurality of <u>instructions</u> to an execution unit to be executed either <u>when</u> a <u>counter</u> for the instruction does <u>not exceed a maximum number of replays</u> or, if the <u>counter</u> for the instruction <u>exceeds</u> the <u>maximum number of replays</u>, <u>when</u> a <u>required data</u> for the <u>instruction</u> is <u>available</u>. (Emphasis added.)

Accordingly, Applicants respectfully submit that, for at least the reasons described above, the Examiner fails to establish a *prima facie* case of obviousness of Claim 19 over <u>Sager</u> in view of <u>Akkary</u>, since neither <u>Sager</u> nor <u>Akkary</u> teach or suggest the aforementioned execution technique for replay of instructions, as required by Claim 19. Furthermore, 35 U.S.C. §103(c) prohibits the Examiner from citing <u>Akkary</u> or <u>Sager</u> as a §103(a) reference. Consequently, Applicants respectfully request that the Examiner reconsider and withdraw the §103(a) rejection of Claim 19.

Regarding Claims 20-24, Claims 20-24 depend from Claim 19 and therefore include the patentable claim features of Claim 19, as described above. Accordingly, Claims 20-24, based on their dependency from Claim 19, and for at least reasons described above, are also patentable over the references of record. Consequently, Applicants respectfully request that the Examiner reconsider and withdraw the §103(a) rejection of Claims 20-24.
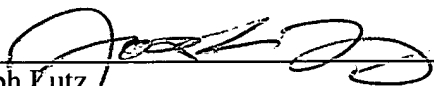
CONCLUSION

Applicants have amended the claims to recite features that are not taught or suggested by the references. No new matter is introduced by the Applicants' claim amendments, which are supported in Applicants' specification and are necessary for placing the present application in condition for allowance.

In view of the foregoing, it is believed that all claims now pending, namely Claims 1-24. patentably define the present application over the prior art of record, and are therefore in condition for allowance; and such action is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207-3800, ext. 738.

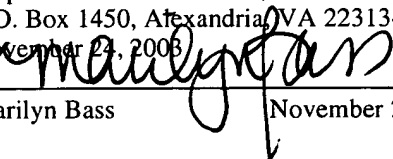Respectfully submitted,

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Dated: November 24, 2003

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CERTIFICATE OF MAILING:
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail , with sufficient postage, in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on November 24, 2003

Marilyn Bass   November 24, 2003